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Isolation, culture and characterization of postnatal human umbilical vein-derived mesenchymal stem cells

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Abstract:

On the basis of reports that mesenchymal stem cells (MSCs) can be isolated from the placenta/umbilical cord stroma, the present study was undertaken to isolate and characterize MSCs from the human umbilical cord veins. In this investigation, a cell population was isolated which was derived from the endothelium/subendothelium layers of 20 umbilical cord veins obtained from term deliveries using a solution of 0.1% collagenase type IV. Results suggest that these cells possess morphological, immunophenotypical and cell differentiation capacities similar to the bone marrow-derived mesenchymal stem cells (MSCs). The isolated cell population has fibroblastoid morphology which upon proper stimulation gives rise to adipocytes, osteocytes and chondrocytes in culture. Immunophenotypically, this cell population is positive for CD54, CD29, CD73, CD49e, CD166, CD105, CD13, and CD44 markers and alpha-smooth muscle actin and negative for CD31, CD45, CD49d, and CD34 markers, von Willebrand factor (vWF) and smooth muscle myosin (MySM). Altogether, these findings indicate that umbilical cord obtained from term deliveries is an important source of MSCs which could have an important application in cell therapy protocols.

Keywords:

Mesenchymal stem cells ، Umbilical cord ، Cell differentiation

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